Case report

A 44-year-old patient reported to the Clinic of Otolaryngology Head and Neck Surgery of the Medical University of Warsaw due to tinnitus and conductive hearing loss on the right side. Previously, he had been under constant ENT care in another center for about 4 years due to exudative otitis of the right ear. In July of 2018, he experienced facial paresis on the right side. Chronic otitis of the right ear was suspected, therefore the patient was qualified for tympanoplasty at another center. While the patient was being prepared for surgery, CT of the temporal bone was performed, revealed an airless mastoid process filled with liquid content.

On CT the tympanic membrane did not present inflammatory changes, while the ossicular chain was surrounded by swollen mucosa. The facial nerve canal did not differ significantly against the background of inflammatory changes. No unambiguous features suggesting the presence of cholesteatoma were found. The patient negated otorrhea.

Due to the unclear image of computed tomography, surgery was withdrawn. At the same time, diagnostics were expanded, and MR of the head was performed. The result indicated the destruction of the mastoid process filled with liquid content. The patient was qualified for surgery to remove the tumor via middle fossa approach, with possible conversion to the retroauricular approach. Ossiculoplasty LC was performed. Diagnostic problems and methods of treatment are discussed.

**ABSTRACT:**

A 44-year-old male presented with a facial schwannoma extending into both the middle cranial fossa and mastoid processus. Due to hearing loss, facial nerve palsy and inflammatory changes in CT scan, this patient was misdiagnosed as chronic otitis media. Audiogram showed a right mixed hearing loss with 30–40 dB air-bone gap. In MR, features of the facial nerve neuroma were found. The patient was qualified for surgery to remove the tumor via middle fossa approach, with possible conversion to the retroauricular approach. Ossiculoplasty LC was performed. Diagnostic problems and methods of treatment are discussed.

**KEYWORDS:**

facial paralysis, facial schwannoma, otitis media

**STRESZCZENIE:**

Praca przedstawia przypadek 44-letniego mężczyzny z nerwiakiem nerwu twarzowego szerzącym się do środkowego dołu czaszki i wyrostka sutkowego. Od 4 lat pozostawał pod stałą opieką laryngologiczną z powodu wysiękowego zapalenia ucha prawego. W audiometrii tonalnej opisano rezewzę 30–40db, bez cech niedosłuchu odbiorczego. W rezonansie magnetycznym opisano zmianę sugerującą nerwiaka nerwu twarzowego. Pacjenta zakwalifikowano do zabiegu usunięcia guza z dostępu przez środkowy dół czaszki z konwersją do dostępu zausznego, oraz wykonano ossikuloplastykę LC. Omówiono problemy diagnostyczne i metody leczenia.

**SŁOWA KLUCZOWE:** nerwiak nerwu twarzowego, porażenie nerwu twarzowego, zapalenie ucha

**ABBREVIATIONS**

CT – computed tomography
MR – magnetic resonance imaging

**INTRODUCTION**

Facial nerve neuroma is a rare benign tumor deriving from the sheath of the seventh cranial nerve. The main symptoms with which patients report to the doctor include: Sensoneural or conductive hearing loss, tinnitus and facial paresis.

In most cases, the origin of the tumor is the genu of facial nerve [1], however this can affect any part of the facial nerve, which makes diagnosis difficult due to non-specific presentation in imaging diagnostics. In radiological diagnostics, it often mimics neurilemmoma or otitis.

Although facial nerve neuroma is the most frequent tumor of the seventh nerve, therapeutic management still remains debatable [2]. We present a case of a 44-year-old male treated for exudative otitis of the right ear.

**CASE REPORT**

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Previously, he had been under constant ENT care in another center for about 4 years due to exudative otitis of the right ear. In July of 2018, he experienced facial paresis on the right side. Chronic otitis of the right ear was suspected, therefore the patient was qualified for tympanoplasty at another center. While the patient was being prepared for surgery, CT of the temporal bone was performed, revealed an airless mastoid process filled with liquid content.

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At the time of patients hospitalization at the Otolaryngology Clinic, he was found with grade VI facial paresis on the right side according to the House-Brackmann scale, with no signs of corneal damage. ENT examination revealed a red, dull, arched tympanum of the right ear without features indicative of tympanic paraganglioma. Tonal audiometry showed a reserve of about 30–40 dB, without the characteristics of sensorineural hearing loss (Fig. 1.). No other pathologies were found.

During preparations for surgery at the Otolaryngology Clinic and reevaluation of the head MR, we found features of facial nerve neuroma, starting from the genu of facial nerve, and descending below into the tympanic cavity. The patient was qualified for excision of tumor from access through the middle cranial fossa with possible conversion to retroauricular access (Fig. 2.).

The surgery was performed under general anesthesia. The petrosal nerve, both greater and lesser, and arcuate eminence were localized, followed by the genu of facial nerve from which the tumor originated and grew into the tympanic cavity. The internal auditory canal was opened, and the presence of the tumor was confirmed. Tumor ingrowth into the tympanic cavity was also found. The above situation required opening of the tympanic cavity. After conversion to extraauricular access, partial filling of mastoid process with tumor masses was observed. The tumor was excised from the mastoid process and tympanic cavity, releasing the facial nerve in the mastoid portion. Ossiculoplasty LC was performed. Retroauricular incision was widened to the neck, and the XII nerve was identified. End-to-side anastomosis of facial and hypoglossal nerves was performed (Fig. 3.).

![Fig. 1.](image1.png) Results of pure-tone audiometry performed during the patient’s stay. The impedance audiometry showed a B curve.

![Fig. 2.](image2.png) MR showing a right-side facial nerve tumor in the described patient.

of pneumatic cells of the mastoid on the right side. The change of 25 x 7 mm with an intermediate ST1 and T2 signal was found within the middle ear and the petrous part of the temporal bone. The change showed substantial contrast enhancement. An expansion towards the middle cranial fossa was also found. According to the radiologist, the image first and foremost suggested glomus tympanum.
DISCUSSION

Facial nerve neuroma is a rare neoplasm and affects 0.15–0.8% of all intratemporal facial nerve tumors [2, 3]. Facial paresis is the most common symptom reported by patients, however due to the slow tumor growth, it may appear late. Sunderland reports normal facial nerve function in 27.3% of patients with neuroma VII [4, 5]. Approximately 5% of patients with primary diagnosis of Bell’s palsy have a facial nerve neuroma [6].

Differential diagnosis is related to trigeminal neuromas and neurilemmoma. A valuable differentiating tool are MR imaging and assessment of direction of tumor growth [7]. Facial nerve neuromas usually grow between the middle cranial fossa and the cerebellopontine angle, into the middle cranial fossa through the apex of petrous part of the temporal bone [7]. Facial nerve neuromas commonly cause destruction of the facial nerve canal of the middle part of the petrous bone, often visible in CT [7].

Surgical treatment is currently the only radical measure of treatment [3]. The surgical approach should be selected based on the anatomical location and direction of tumor growth. A middle fossa craniotomy is used in patients with neuromas located in the external auditory canal and with good hearing. Translabyrinthine or transpetrous approach is useful for patients with deep hearing loss. Indications for the use of retrosigmoid access in neuromas of the facial nerve are limited [3]. Single-stage nerve reconstruction is recommended [3]. Despite reconstruction, we do not observe a return of full facial nerve function above the 3rd grade on the House-Brackmann scale [8]. There are many surgical techniques that permit facial nerve reconstruction. A direct end-to-end anastomosis of damaged branches is characterized by the best prognosis. Sometimes, due to high tension or a large range of damaged nerves, such a connection is not possible. In such case, we use cable nerve grafting with placement of the great auricular nerve. Such a technique is especially useful for defects larger than 1 cm. In some cases, we choose cross face nerve graft, muscle transfer and myofascial graft [9, 1, 10]. There is no surgical technique of nerve reconstruction that would guarantee the return of facial nerve function above the 3rd grade on the House-Brackmann scale [9, 1].

Analysis of the MR in the discussed case suggested the presence of a small tumor coexisting with inflammation within the mastoid. Such a clinical picture was the foundation for planning a cable graft from the great auricular nerve. The advancement of tumor causing destruction of the middle ear, mastoid, facial nerve in both the tympanic and mastoid portion has forced the consideration of other reconstructive measures. A large defect of the nerve required end-to-side anastomosis of the facial nerve with the hypoglossal nerve. In order to perform such anastomosis, the cervical incision was extended and Blair’s incision was modified for parotidectomy. The technique of connecting both nerves was described by Körte in 1903 and has been subject to numerous modifications [9]. In VII–XII end-to-side anastomosis, the facial nerve of a part of the mastoid process is mobilized and rotated to the neck. Next, the connective tissue around the hypoglossal and facial nerves and the epineurium is removed to reveal the perineurium, which is then anastomized.

Fig. 3. a. An image from access through the middle cranial fossa. A tumor visible from the genu of facial nerve. b. Visible open upper wall of the tympanic cavity, a tumor entering it and destroying the stapes. c. Image after conversion to retroauricular access. A tumor filling the cells of the mastoid process. d. Anastomosis of the facial nerve with the hypoglossal nerve.
The authors of numerous papers report that the hypoglossal nerve is most suitable for anastomosis with the facial nerve due to its similar diameter and a large number of myelinated motor axons. Furthermore, the proximity of the facial and hypoglossal nerve nuclei in the brainstem favorably affects the outcomes of the subsequent functioning of the reconstructed nerve [9]. The consequence of this technique is the possibility of atrophy of the muscles of half the tongue [11]. VII–XII anastomosis is best performed within two months of nerve injury [9]. Before anastomosis, it is recommended to perform electromyography assessing the bioelectrical activity of the nerve.

The described patient was discharged home from the Clinic in good general condition after 7 days of the surgery. He reported a progression in hearing and a marginal improvement in eye closing at maximum effort. The early postoperative period involved the occurrence of insignificant disorders of tongue mobility on the operated side. The patient remains under continuous laryngological care of the Clinic.

References


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